

CLAIMS

1. A vertical take-off and landing aircraft comprising:

(a) a main body adapted for flight while oriented substantially in a horizontal
5 plane;

(b) at least one air impeller engine mounted in said main body oriented substantially along a vertical axis normal to the horizontal plane having an impeller rotor mounted within an air channel duct or shroud formed in said main body of said aircraft, said impeller rotor being formed with impeller blades with inner ends fixed to a central hub and outer ends fixed to an
10 annular impeller disk rotatable about a rotational axis aligned with the vertical axis to propel a downward flow of air to provide vertical lift to the aircraft, and a magnetic bearing system for suspending the impeller rotor substantially friction-free within the air channel duct or shroud; and

(c) a magnetic induction drive formed by one array of magnetic induction elements arranged circumferentially on the annular impeller disk of said impeller rotor and another
15 array of magnetic induction elements arranged on a wall of said air channel duct or shroud facing opposite the array on the annular impeller disk across a small air gap therebetween for driving the impeller disk in rotation by magnetic induction.

2. A vertical take-off and landing aircraft according to Claim 1, further
20 comprising an air directing assembly for directing at least a part of the thrust flow of air from the air impeller engine in a desired angular direction with respect to the horizontal plane to generate a horizontal thrust component for maneuvering or translation movement of the aircraft.

3. A vertical take-off and landing aircraft according to Claim 2, wherein said air
25 directing assembly is an air vane assembly mounted below said air impeller engine having a pair of rotatable vanes, one rotatable on an X axis and one rotatable on a Y axis perpendicular to each other in the horizontal plane, and vane actuator means for rotating each vane at a selected deflection angle on its axis for directing the thrust flow of air in a desired angular direction.

30 4. A vertical take-off and landing aircraft according to Claim 2, wherein said air

9. A vertical take-off and landing aircraft according to Claim 1, having a single air impeller engine arranged on a central vertical axis of the vehicle.

5 10. A vertical take-off and landing aircraft according to Claim 1, having two air impeller engines arranged at opposite ends of the main body formed with a longitudinal fuselage chassis and balanced about its center of gravity.

10 11. A vertical take-off and landing aircraft according to Claim 1, having three engines positioned in a triangular arrangement on the main body balanced about its center of gravity.

15 12. A vertical take-off and landing aircraft according to Claim 11, wherein one engine is positioned at a forward apex of the triangle oriented in a forward flight direction and the other two engines are spaced apart and carried on an overhead wing mounted on the main body.

20 13. A vertical take-off and landing aircraft according to Claim 1, having multiple engines positioned in a symmetrical arrangement on the main body and balanced about its center of gravity.

25 14. A vertical take-off and landing aircraft according to Claim 1, wherein said main body is formed with a longitudinal fuselage chassis oriented in a forward flight direction and a pair of winglets arranged on respective sides of the longitudinal fuselage chassis for controlling flight stability.

15. A vertical take-off and landing aircraft according to Claim 1, having air rudders or flaps provided on said main body for controlling flight stability.

30 16. A vertical take-off and landing aircraft according to Claim 1, wherein said main body is formed with a longitudinal fuselage chassis oriented in a forward flight direction and

an overhead wing mounted on said main body for providing lift and controlling flight stability.

17. A vertical take-off and landing aircraft according to Claim 1, wherein said magnetic induction drive is powered by electric power provided by lightweight batteries carried on
5 said main body.

18. A vertical take-off and landing aircraft according to Claim 1, wherein said magnetic induction drive is powered by electric power provided by lightweight fuel cells carried on
said main body.

10 19. An air impeller engine oriented substantially along an impeller axis having an impeller rotor mounted within an air channel duct or shroud, said impeller rotor being formed with impeller blades with inner ends fixed to a central hub and outer ends fixed to an annular impeller disk rotatable about the impeller axis to propel a thrust flow of air, a magnetic bearing system for
15 suspending the impeller rotor substantially friction-free within the air channel duct or shroud, and a magnetic induction drive formed by one array of magnetic induction elements arranged circumferentially on the annular impeller disk of said impeller rotor and another array of magnetic induction elements arranged on a wall of said air channel duct or shroud facing opposite the array on the annular impeller disk across a small air gap therebetween for driving the impeller disk in
20 rotation by magnetic induction.

20. An air impeller engine according to Claim 19, further comprising an air directing assembly for directing at least a part of the thrust flow of air from the air impeller engine in a desired angular direction with respect to the impeller axis.